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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/284,222	07/22/1999	HISASHI TSUJIMOTO	P990708	2037

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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 06/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/284,222

Applicant(s)  
Tsujimoto

Examiner  
Tracy Dove

Art Unit  
1745



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Apr 4, 2002
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 7-9 and 12-16 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-9 and 12-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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### **DETAILED ACTION**

This Office Action is in response to the communication filed on 4/4/02. Upon further review and translation of Koichiro, JP 9-213337, claims 7-9 and 12-16 are rejected in view of the prior art. This Action is Non-Final.

#### ***Response to Arguments***

In view of the Appeal Brief filed on 4/4/02, PROSECUTION IS HEREBY REOPENED. A new ground of rejection has been applied to reject claims 7-9 and 12-16 as set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites a "binder comprises a cellulose derivative as a viscosity reducing agent", which is confusing. The specification states the cellulose derivative is a "viscosity bodying agent" (see page 6). Cellulose derivatives such as CMC (see specification page 7) are normally considered thickening agents (increase viscosity). This is evidenced by Hawley's Condensed Chemical Dictionary, pages 236-238, which describe cellulose and cellulose derivatives as "high polymer(s)" and "thickening agent(s)".

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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Claims 7-9 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Koichiro, JP 9-213337.

Koichiro teaches a binder for a battery, a binder composition and an electrode including the binder. The battery of Koichiro provides stable performance by increasing an initial capacity, reducing a capacity decrease and decreasing chipping and cracking of an electrode surface pasted with an active material. The binder composition has a polyvinylidene fluoride system polymer (for instance, polyvinylidene fluoride) and a rubber polymer dispersed in an organic solvent. The binder composition and active material are mixed to form a slurry and the slurry is applied to a current collector. The solvent is dried to form the electrode of the battery. See abstract. The negative electrode active material is carbon and the positive electrode active material is  $\text{LiCoO}_2$ . See abstract. Koichiro teaches that the polyvinylidene fluoride is at least 50% or greater of the binder material (see page 2, 2nd col., after [0009]) and the rubber polymer is 50% or less of the binder material (page 3, 1st col., after [0010]).

A partial Japanese translation of the reference is attached.

Koichiro has a specific teachings that the negative electrode contains 8 wt% of binder in addition to the carbon active material. See Examples, paragraph [0036]. Moreover, the binder is contained in the positive electrode in an amount of 4 wt%. See Examples, paragraph [0037]. A nonaqueous cell comprising the positive and negative electrodes was then assembled (see paragraph [0039]). Koichiro teaches the rubber polymer is an aromatic vinyl and conjugated-diene system polymer which is formed by emulsion polymerization as a latex particle (see

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paragraph [0015]). The abstract teaches the rubber polymer may contain styrene and butadiene (also see paragraph [0014]).

Thus the claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koichiro, JP 9-213337.

See discussion of Koichiro above.

Koichiro does not explicitly teach the inventive binder further includes a cellulose derivative and does not specifically teach the type of carbon material in the negative electrode.

However, Koichiro does teach and suggest adding carboxyl methyl cellulose as a thickener (viscosity agent) to a binder composition including a styrene-butadiene latex is known in the art. See paragraph [0005] under "Prior Art".

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include CMC in a binder composition containing polyvinylidene fluoride and styrene-

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butadiene latex because Koichiro teaches that these compounds are known to be used together in a binder composition for a negative electrode. Koichiro teaches that CMC is a known thickening agent for negative electrodes containing a carbon active material and a polyvinylidene fluoride binder.

Regarding claims 14 and 15, one of skill would know that graphite or non-graphitizing carbon is a carbon material and is commonly used as the negative electrode active material for nonaqueous batteries. Linden, Handbook of Batteries, pg. 36.4, Table 36.2 teaches the various well known carbon materials for a negative electrode. See also Table 36.3 on page 36.6. Both graphite and coke are shown by Linden to be typical or common negative electrode materials.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koichiro, JP 9-213337 in view of Abe et al., JP 8-195201.

See discussion of Koichiro above.

Koichiro does not explicitly teach the amount of the cellulose derivative added to the negative electrode.

However, Abe teaches a nonaqueous battery negative electrode mix which is high in viscosity. Abe teaches that it is known to mix water and carboxymethyl cellulose (CMC) together, then add polyvinylidene fluoride, acetylene black and graphite to obtain the negative electrode mix. Abe teaches that aggregates such as binder aggregate and carbon aggregate in the negative electrode mix can be reduced without the viscosity of the negative electrode mix being

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lowered. Abe teaches the CMC was added in an amount of 0.5-5 wt% as a thickener to the binder composition (see paragraphs [0008] and [0010]). A partial Japanese translation of Abe et al. is attached.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include 0.1-5 wt % of CMC in a binder composition containing polyvinylidene fluoride and styrene-butadiene latex because Abe and Koichiro both teach that these compounds are known to be used together in a binder composition for a negative electrode. One of skill would be motivated to combine Abe and Koichiro because they teach negative electrodes for nonaqueous batteries containing carbon, polyvinylidene fluoride and CMC. Abe is applied to show a prior art teaching of an amount of CMC added to the negative electrode mix. Both Abe and Koichiro teach that CMC is added to the negative electrode mix as a thickening agent.

### ***Response to Arguments***

Applicant's arguments with respect to claims 7-9 and 12-16 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.



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Koga et al., US 5,565,284, teaches a lithium secondary cell using carbon as a negative electrode material (col. 4, lines 41-43). The amount of binder material added is preferably about 3 to about 13 parts by weight per 100 parts by weight of the electrode material. Smaller amounts of binder material would provide less adhesion whereas larger amounts of the binder material would result in an insufficient cell capacity. See col. 5, lines 36-41.;

Yamada et al., US 5,576,121, teaches a lithium secondary battery comprising a negative electrode active material of a graphite (abstract). The negative electrode includes the graphite and a binder, such as a fluoropolymer. The binder is 1-30 wt% based on the total amount of graphite in the negative electrode. If the ratio of the binder is greater than 30, the resistance or polarization of a negative electrode is increased, thereby reducing the discharge capacity of the electrode. A lithium battery fabricated with such a negative electrode is not suitable for practical use. If the binder content is less than 1 wt%, the binding ability is lost, resulting in falling-off of the active material and in reduced mechanical strength. See col. 7, lines 11-28.

Hasegawa et al., US 5,609,975, teaches a lithium secondary cell having a binder content range of 0.5-10% by weight of an electrode. The greater amount of binder prevents smooth current collection to lower the capacity, while the smaller amount reduces the strength of the electrode to deteriorate the properties. See col. 12, lines 61-67.

Sonobe et al., US 5,527,643, teaches an electrode including a carbonaceous material and a binder (such as polyvinylidene fluoride or polytetrafluoroethylene). The binder is preferably added in a proportion of 1-20 wt% of the carbonaceous material. If the amount of binder is

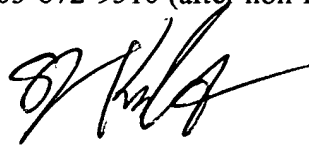
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excessive, the resultant electrode is liable to have too large an electric resistance and provide the battery with a large internal resistance (reduce capacity). See col. 8, lines 34-51.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).



STEPHEN KALAFUT  
PRIMARY EXAMINER  
GROUP 1700

June 5, 2002